

A METHOD

PROPHYLAXIS IN DIPHTHERIA

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A METHOD OF PROPHYLAXIS IN DIPH- THERIA.¹

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EVERY experienced practitioner has probably observed that in certain families one or more of the members regularly take sick with diphtheria in the spring or fall of the year.

This is particularly true in the case of children, and, according to my personal experience, the months of October, November, March, and April are those in which such patients are prone to contract the disease.

It occurred to me that persons thus frequently afflicted might harbor the diphtheritic poison, or the microbes essential to its formation and septic power, in their nasal and oral cavities most of the time, without damage to the organism; but as soon as active hyperæmia of a neighboring mucous membrane took place from any cause whatsoever, the germs of diphtheria would readily find foothold in this damaged mucous lining, and manifest their presence in the various ways and forms familiar to us.

In a spirit of investigation, and with the object of testing to a certain extent the correctness or fallacy of this view of auto-infection—which, by the way, may be held by other observers, and which is certainly not in-

¹ Read before the New York Academy of Medicine, January 19, 1898.

compatible with our present knowledge of the disease under consideration—I selected eight patients of various ages, all of whom had suffered from true diphtheria, to my knowledge, twice or more prior to October 1, 1885.

Case.	Name.	Age. Years.	
1.	S. K.	14	} Members of one family who have had diphtheria once or twice each year from 1882 to 1885.
2.	E. K.	16	
3.	L. K.	26	
4.	G. S.	3	} Two attacks of diphtheria prior to October 1, 1885.
5.	E. B.	5	} Three attacks of diphtheria prior to October 1, 1885.
6.	K. I.	12	} More than three attacks prior to October 1, 1885.
7.	M. S.	3	} Children belonging to one family; both have had diphtheria several times.
8.	G. S.	6	

The families represented in the above table by one or more members have been known to me for a long time, they live in different parts of the Tenth and Seventeenth Wards of this city, and each respective family has occupied the same house or apartments, and lived in the same surroundings, for a number of years. The adults enumerated above, and the parents of the children mentioned in my list, were intelligent enough to appreciate the importance of carrying out the following suggestions, viz. :

I. All carious teeth to be filled or extracted, and the teeth to be examined by a dentist from time to time.

II. The mouth to be thoroughly rinsed three times a day, after each meal, with one of the following solutions :

(a) Three per cent. solution of potassium chlorate in water; or (b) liquor sodæ chlorinat. in water, 1 to 20; (c) a saturated solution of boric acid in water (four per cent.); the liquids to be alternately used and changed every four weeks. They were to be used as a gargle, as a mouth wash, and dropped into the nostrils by means of a medicine dropper three times a day.

III. In the case of the children not able to gargle, the liquid was to be dropped into each nostril from a pipette (medicine dropper), three times daily.

IV. These precautionary measures to be strictly carried out from October 1, 1885, for one year, or eventually two years, except during the hot months, in which diphtheria had never been observed in these families, and when most of the parties under observation were out of town.

In addition to these eight cases, two infants, each about one year of age, who had never been sick with diphtheria, were treated during the time stated above in the following manner: Ten to fifteen drops of the boric-acid solution was dropped by means of a medicine dropper into each nostril twice a day, immediately on awaking and before sleeping, with the understanding that the boric acid solution was to be used in this way every three hours, if at any time symptoms of nasal catarrh should be noticed.

Results.—From October 1, 1885, to December 1, 1887, not one of the persons experimented upon suffered from diphtheria.

Patients Nos. 1, 3, 4, 6, and 8, had several attacks of acute pharyngitis and amygdalitis during the time of experimentation, characterized by a dusky redness of the throat with moderate swelling of the tonsils, and a moderate rise of temperature.

An adult member of the family at the head of the list (but not under observation) suffered from diphtheria in February, 1887. Patients 1, 2, and 3, members of the same family, were exposed to infection, but did not contract the disease.

The mother of one of the infants took sick with diphtheria in March, 1887; also the servant in the family. The infant was isolated from the sick ones, but not removed from the house, and did not take sick.

Remarks.—This brief but accurate report of the above facts does not embody the absolute proof of pro-

phylactic cause and effect, but it certainly goes far to establish the belief that, if the nasal and oral cavities are kept tolerably clean by means of harmless, non-irritating liquids known to possess antiseptic (disinfectant) properties, the frequency of diphtheritic infection is markedly reduced.

The treatment of diphtheria is a perennial subject for discussion all over the civilized world ; at the same time, rational and thorough prophylaxis has not received the attention from practitioners in medicine which it merits.

If we scrutinize the vast amount of information which has accumulated concerning the manifestations of what is known to us under the name of diphtheria—information which has been furnished by careful and competent observers, and by some of the most acute minds of the present century, in the domain of practical and experimental medicine—we must candidly admit that we are not in possession of positive knowledge as to the nature of the diphtheritic virus, its mode of propagation, and its predilection for certain individuals, notwithstanding the most painstaking research of Loeffler, Emmerich, Wood, Formad, and others.

If we admit our ignorance of the true nature and significance of so-called diphtheria, we must also admit that we cannot with certainty differentiate clinically between contagious and non-contagious acute inflammatory changes of the mucous membrane of the naso-pharynx and buccal cavity ; and we are thus compelled to look with suspicion upon all such changes, and apply our prophylactic and therapeutic measures in accordance with this view, which was first publicly proclaimed by A. Jacobi twenty-eight years ago, in a paper (published in the *New York Medical Times*) on diphtheria and diphtheritic affections, and publicly upheld in his controversy with B. Fraenkel, of Berlin (*vide Berliner Klin. Wochenschrift*, Nos. 17 and 18, 1886), in an article entitled "Follicular Amygdalitis," published in *THE MEDICAL RECORD*, November 27, 1886.

Furthermore, we may safely commit ourselves to state that, although the line of treatment which we pursue in diphtheria is not without its influence in checking the progress of the disease and in stimulating the system until the disease shall have exhausted its virulent properties, we have no means of absolute control at our command, or, in other words, no specific treatment for diphtheria.

And, finally, as a logical sequence of such reasoning from facts, we certainly do not assert too much if we declare that, in the present state of our knowledge, practical methods of prophylaxis in diphtheria will be of more value to the community than the most approved method of treatment, whatever that may be.

And now, a few words about prophylactic measures. We have, in the first place, general preventive measures, such as hygienic legislation, enforcement of sanitary rules regarding dwellings, ventilation, food, occupation, erection of isolation hospitals, general disinfection, etc.; and, in the second place, methods of prophylaxis within the family and directed to or against the person or individual.

Without intending to underrate the importance of general sanitary enactments, I would suggest that in a large city only a limited number of inhabitants can live in salubrious surroundings, and that the majority of the people in large cities are not, and never will be, able to live in first-class healthy abodes; the more so as we are still in the dark as to the actual source of danger from infectious diseases, which makes it all the more difficult to escape from their embrace.

I am of opinion, therefore, that while the dictates of sanitary science should be carried out strenuously, the utmost importance should be attached to personal and individual preventive measures.

Now let us take up for one moment the subject of individual prophylaxis, and abstract from the vast literature of diphtheria such prophylactic suggestions as appear simple and practical. It has been a surprise to me to

find the subject barely mentioned in the majority of our text-books and works of reference.

In the latest edition of Ziemssen, in Oertel's article on diphtheria, no mention is made of prophylaxis, and we look in vain for information on the subject in such text-books as Eustace Smith, "Diseases in Children," 1884; West, "Diseases of Infancy and Childhood," 1874; Day, "Diseases of Children," 1881; Meigs and Pepper; Rilliet and Barthez, "Maladies des Enfants," Paris, 1887; or the latest edition of Vogel's "Children's Diseases," who simply mentions isolation and fumigation of infected localities. Preventive methods are not mentioned in Buck's "Reference Handbook of the Medical Sciences," New York, 1886; and the author of the article on diphtheria, in the latest edition of "Eulenburg's Cyclopædia," disposes of the subject in ten lines, stating that he has seen no advantage from prophylactic gargles, and is of opinion that strong solutions do harm by causing hyperæmia, which is undoubtedly true. He mentions potassium permanganate, vinegar, alcohol, lime-water, carbolic acid water one-half per cent., and chlorate of potassium solutions as liable to do harm.

Austin Flint, in his "Principles and Practice of Medicine," speaks only of isolation of patients, and thorough disinfection of dejections and all articles which have been in contact with patients.

E. Schottin, "Die Diphtheritische Allgemein Erkrankung," Dresden, 1885, says, page 83: "I have known all attempts to prevent the spread of diphtheria by prophylactic measures to fail."

Semple, in a monograph on diphtheria, 1879, and E. S. Gaillard, "Diphtheria," a prize essay (Richmond, 1867), do not mention preventive measures; and G. F. Wachsmuth, "Die Diphtheritis Heilmethode," Berlin, 1886, simply says that a sponge-bath with friction is good preventive treatment for children.

In some other publications I have found the subject at least under brief consideration.

Max Gaube ("Entstehung der menschlichen Rachendiphtherie," Leipzig, 1884), says: "A healthy mucous membrane of the pharynx and nose is an impediment to diphtheritic invasion."

Rigauer ("Die Diphtherie u. das kalte Nasenbad," Leipzig): "The abundant mucus in the naso pharyngeal catarrh of children is excellent material for the growth and development of diphtheritic virus, which gets into the system through some epithelial lesion."

F. Stecher, a practitioner in Munich, has written an excellent monograph ("Zum Schutz wider die Diphtherie," Berlin, 1884), in which he says: "A healthy condition of the throat has the same importance in relation to diphtheria as a healthy stomach in times of cholera." He advises isolation, disinfection, and the wearing of a mask filled with salicylated cotton. Dust and smoke are to be avoided, carpets are condemned, children's necks should be washed daily with cold water, and they should gargle as soon as the throat is unusually red.

C. Gerhard ("Verhandlungen des 2. Congresses für innere Medizin") says: "I feel convinced that prophylaxis in the household, and frequent cleaning of the nose and throat for the purpose of keeping them in a healthy condition, will do more good than the most approved methods of treatment."

In our own country, J. L. Smith ("Diseases of Children") has a short chapter on preventive measures in diphtheria. He advises isolation, disinfection of apartments, linen, spittoons. When diphtheria is prevalent children's fauces should be frequently and carefully inspected, and if they seem too red they should be sprayed with proper remedies.

H. Francotte ("La Diphthérie," page 398, Paris, 1885) says: "At the present time there is no efficacious prophylactic treatment for diphtheria. Children should be accustomed to changes of temperature by cold frictions of the whole body, frequent gargling with cold water, and an abundance of fresh air; and he suggests

that gargles with antiseptic liquids may do some good by carrying away putrescible matter from the oral cavity. He also reports that Marotti, of Venice (*Gazz. Med. di Venezia*, October, 1884), has made twenty preventive inoculations for diphtheria in 1864.

Vincenzo Cozzolino ("Tratato della Difteria," Naples, 1887) reports, on page 309, that: "Norberto Perotti (*Archivia di Pathologia Infantile*, March, 1885) recommends the black sulphide of mercury mixed with equal parts of gum arabic, to be insufflated. He claims that persons treated in this manner escaped contagion during an epidemic of diphtheria in Albano Laziale, a town in which he practised, except two children in his own family. Cozzolino believes that it may be possible in the future to prevent diphtheria by inoculating the attenuated virus.

I do not know how I could aid the cause of preventive measures in diphtheria more than by quoting the language of a physician who has studied this disease the greater part of his life.

Abraham Jacobi, in his treatise on diphtheria (the last edition of which appeared in 1880), says, on page 32: "As there are individuals, so there are families which have a predisposition to disease, and there are others in whom, notwithstanding ample exposure, infection does not easily take place."

"That the contagiousness of diphtheria should still be doubted is hardly possible, and still the public act as if it did not exist. It is certainly transmitted by spoons, glasses, handkerchiefs, and towels. Oertel has seen diphtheria of the pharynx which was communicated by the act of kissing, and developed in two days."—Pages 57, 58. "One important axiom must be borne in mind, namely, that prevention is more easy than cure, and there are certain prophylactic measures which will prove valuable in the hands of every good physician. It is necessary, under all circumstances, that the mouth and pharynx of

every child be constantly kept in a healthy condition." —Page 158.

Cases of pharyngitis and amygdalitis, no matter whether influenced by an epidemic or not, furnish an indication for the prophylactic use of potassium chloride.

On page 172 of the same work we read: "Unnecessary petting of the patient on the part of the well ought to be avoided—kissing forbidden. The well, or apparently well, children of a family that have diphtheria at home must not go to school or to church. Teachers ought to be taught to examine throats, and directed to examine every child's throat in the morning, and return home every one barely suspicious."

Finally, I would refer to Dr. A. Jacobi's article on "Diphtheria Spread by Adults" (*New York Medical Journal*, September 24, 1884), and quote from his article on "Follicular Amygdalitis" (*THE MEDICAL RECORD*, November 27, 1886) as follows: "I claim that the name of follicular or lacunar amygdalitis is but a subterfuge for the lack of a correct or complete diagnosis," and "whether membrane or point, the contagiousness of the disease is the very same." With punctate diphtheria "the adult is in the street, in business, in the school-room, in the railroad car, in the kitchen and nursery. With this variety parents, while complaining of slight throat trouble, which is not heeded, kiss their children."

Can it be difficult to understand, in the light of such evidence, that the physician, if he be true to his calling, must strive henceforth to cultivate and carry out practical methods of prophylaxis in contagious disease? I think not.

Permit me to close this paper with a brief *résumé* of some of the points which appear to me worthy of attention.

In a city with densely populated districts, such as the Tenth, Eleventh, Fourteenth, and Seventeenth Wards of New York, the reconstruction of plumbing arrangements and erection of air-shafts in tenement-houses, are useful

measures of sanitary reform if supplemented by universal attention to the details of individual disease prophylaxis, and it is the noble privilege of each member of our profession to aid our local health authorities by instructing the people in such matters as often as opportunity presents.

The overheating of school-rooms and living-apartments should be most emphatically denounced as dangerous.

Isolation of the sick should be explained and insisted upon, and the management of isolation hospitals for the poor should be such as to rapidly gain their confidence.

Enlarged tonsils should be reduced by the knife, or, better still, by means of the galvano-cautery. Carious temporary teeth of children should be removed promptly, and to the poor should be given the opportunity to have carious teeth filled with amalgam or cement for a nominal small fee or free of charge.

Parents should inspect their children's mouths and throats each day before sending them to school. Children readily learn to use their own fingers as tongue depressors, and it is important that they learn to gargle at an early age.

Children suffering from simple sore throat (apparently) should not attend school until they are quite well; and in follicular amygdalitis and other forms of acute sore throat, preventive measures should be strictly carried out.

Adults with sore throats should not mingle with children.

The kissing of children upon the lips should be forbidden, and parents themselves should set an example in this direction.

Children old enough to gargle and rinse their mouths should be taught to do so after each meal, a weak solution of one of the harmless antiseptic chemicals to be used; and in the case of young children such solutions should be dropped into the nostrils regularly twice a day, or oftener if symptoms of nasal catarrh supervene. The outfit necessary for carrying out such proper measures

consists of one ounce of the antiseptic chemical, dissolved in a wine-bottle of water, and a medicine-dropper.

It should become a habit with parents to attend to these precautionary matters with the same regularity as they attend to other matters of cleanliness, and the best opportunity for the physician to introduce such measures is at a time when one member of a family has contracted diphtheria and there are others in danger of being infected.

Recognizing that it is impossible to lay bare and control all sources of diphtheritic infection, it will be more practical to teach the individual to protect himself and his surroundings by striving to keep in a healthy condition those parts which are found by experience to be generally affected.

Necessity being the mother of invention, let us hope and believe that in the near future we may have at our command simple methods of prophylaxis which may be safely placed in the hands of all rich or poor who are willing and intelligent enough to appreciate the benefit to be derived from their employment.

